

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Original) A *Drosophila* cell comprising an olfactory receptor neuron containing a non-*Drosophila* odorant receptor in place of its endogenous odorant receptor(s).
2. (Original) An *in vivo* system for determining whether a non-*Drosophila* odorant receptor binds to a test chemical, said system comprising:
  - a. a *Drosophila* cell comprising an olfactory receptor neuron containing a non-*Drosophila* odorant receptor in place of its endogenous odorant receptor(s);
  - b. a test chemical;
  - c. a means of contacting the *Drosophila* cell with the test chemical; and
  - d. a means to measure the neuron response to the test chemical.
3. (Original) A method of determining whether an odorant receptor responds to a test chemical, said method comprising contacting a *Drosophila* cell with the test chemical, said cell comprising an olfactory receptor neuron containing a non-*Drosophila* odorant receptor in place of its endogenous odorant receptor(s), and measuring the odor response of the neuron, thereby determining whether the odorant receptor binds the test chemical.
4. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the olfactory receptor neuron is a ab3A neuron.
5. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein a *Drosophila* fly comprises the cell of claim 1.

6. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the endogenous odorant receptors are encoded by *Or22a* and *Or22b*.
7. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the non-Drosophila odorant receptor is from an insect that is a human pest or a plant pest.
8. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the non-Drosophila odorant receptor is isolated from an insect of the genus *Anopheles*.
9. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the non-Drosophila odorant receptor is encoded by *AgOr1* or *AgOr2*.
10. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the non-Drosophila odorant receptor is encoded by cDNA.
11. (Currently Amended) The system of claim 2 ~~or method of claim 3,~~ wherein the test chemical is a volatile or semi-volatile chemical.
12. (Currently Amended) The system of claim 2 ~~or the method of claim 3,~~ wherein the test chemical is a component of mammalian sweat.
13. (Currently Amended) The system of claim 2 ~~or the method of claim 3,~~ wherein the odor response is measured by single-unit electrophysiology.

14. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the gene encoding the non-Drosophila odorant receptor is operably linked to an *Or22a* promoter sequence.

15. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the gene encoding the non-Drosophila odorant receptor is operably linked to a *Gal4* sequence.

16. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the gene encoding the non-Drosophila odorant receptor is operably linked to a *UAS* sequence.

17. (Currently Amended) The cell of claim 1, ~~system of claim 2, or method of claim 3,~~ wherein the gene encoding the non-Drosophila odorant receptor is operably linked to an *Or22a* promoter sequence, a *Gal4* sequence, and a *UAS* sequence.

18. (Original) An *in vivo* system for determining whether an odorant receptor binds to at least one chemical in a test mixture of two or more chemicals, said system comprising:

- a. a Drosophila cell comprising an olfactory receptor neuron containing a non-Drosophila odorant receptor in place of its endogenous odorant receptor(s).
- b. a test mixture comprising two or more different chemicals;
- c. a means of contacting the Drosophila cell with the test mixture; and
- d. a means to measure the odor response of the neuron.

19. (Original) A method of determining whether an odorant receptor binds to at least one chemical in a test mixture comprising two or more chemicals, said method comprising contacting

a *Drosophila* cell with the test mixture, said cell comprising an olfactory receptor neuron containing a non-*Drosophila* odorant receptor in place of its endogenous odorant receptor(s); and measuring the response of the neuron, thereby determining if the odorant receptor binds to at least one chemical in the mixture.

20. (Original) The method of claim 19 further comprising testing the individual chemicals in the mixture, either individually or in various combinations, thereby determining which chemical(s) in the mixture bound with the receptor to cause neuron firing.